Abdominal tuberculosis in urban Britain – a common disease

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SUMMARY Between 1973 and 1983 abdominal tuberculosis was responsible for the admission of 90 patients to a west London district general hospital. Over the same period Crohn's disease was newly diagnosed in 102 hospitalised patients. In contrast with Crohn's disease, the majority (75) of tuberculous patients were Asian immigrants. Mean duration of residence in the United Kingdom was 4 ± 0.9 (SD) years, and mean age at presentation was 34.9 ± 1.1 years. Forty per cent of tuberculosis patients presented as an acute emergency to physicians, surgeons, or gynaecologists while the remainder presented a more insidious, chronic picture. Five groups of tuberculous patients were recognised. Forty two subjects had intestinal tuberculosis characterised by pain (100%), abdominal mass (43%) and abnormal contrast radiology (100%). Ten of these underwent emergency laparotomy for intestinal obstruction or perforation. Twenty seven patients had tuberculous peritonitis although only 16 had ascites. Eight patients presented with pyrexia and granulomatous hepatitis. Five had pulmonary and abdominal tuberculosis. The remaining eight patients represented a miscellaneous group. The diagnosis of abdominal tuberculosis was established histologically (60 cases), bacteriologically (six cases) or radiologically (24 cases). Chest radiograph, tuberculin skin testing and paracentesis were usually unhelpful. Five severely ill patients died. The remainder recovered completely after specific triple chemotherapy and response to treatment was usually evident within 14 days. In urban Britain tuberculosis is an important cause of abdominal disease. Prognosis is excellent following specific therapy.

Abdominal tuberculosis is an important, but probably underestimated, clinical problem. Differentiation from Crohn's disease may be difficult but is crucial because treatment is distinct.

Abdominal tuberculosis has been considered to occur rarely in the United Kingdom¹⁻³ but this impression is not confirmed by our experience. During the period 1973-1983, 90 patients have presented to the Central Middlesex Hospital with abdominal tuberculosis. Over the same period Crohn's disease was diagnosed in 102 hospitalised patients. The hospital serves the London Borough of Brent which has a large immigrant population and has the highest incidence of pulmonary tuberculosis in the United Kingdom. Our experience is therefore not typical of more affluent parts of the UK but may

reflect that of other areas with large Asian populations. There have been few previous reported series describing abdominal tuberculosis in Britain.¹⁻⁷ Each has contained relatively small numbers of patients and clinical details have been sparsely recorded. These studies have shown that abdominal tuberculosis has few specific features. The diagnostically useful aspects of the disease have not been stressed. In this review of a large number of patients presenting to a single centre over a relatively short time period we aim to increase the awareness of this relatively common disease and emphasise the diagnostically helpful features.

Methods

PATIENTS

Between January 1973 and January 1983, 90 patients were admitted to the medical, surgical or gynaecological departments of Central Middlesex Hospital

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with proven abdominal tuberculosis. The mean age of the group was 34.9 ± 1.1 years (SD), range 3 to 71 years. Forty six were men. Seventy four subjects (82%) were Asians. Twenty nine had emigrated from India, 45 were African Asians (principally from Uganda, Kenya, Tanzania), four were Pakistani. There were four West Indians, two Irishmen, three Sri-Lankans and only three British natives. The mean duration of residence in the United Kingdom (excluding the three Britons) was 4 ± 0.9 years, range three months to 15 years.

DIAGNOSIS

The diagnosis of abdominal tuberculosis was made by histological examination of tissue obtained by laparotomy (41 patients), liver biopsy (eight patients), lymph node biopsy (two patients), colonoscopy (three patients), pleural biopsy (one patient) or necropsy (five patients). In other cases the diagnosis was established by radiological techniques associated with a prompt response to specific chemotherapy (24 patients). Tubercle bacilli were identified in ascitic fluid from four patients and from abscess material in two cases.

CLINICAL PRESENTATION

Patients could be classified into five groups according to their disease presentation: I intestinal, II peritoneal, III pyrexia with hepatic granulomata, IV abdominal manifestations and pulmonary tuberculosis, V miscellaneous.

GROUP I

Forty two patients (43%) had intestinal tuberculosis (Table 1). The diagnosis was established in 20 patients by laparotomy. An inflammatory intestinal mass, often associated with mesenteric lymphadenopathy was characteristically found (Fig. 1). Histological examination of intestinal tissue was characterised by transmural inflammation with giant cells and granulomata (Fig. 2). Tubercle bacilli were identified in only one case. Caseation was only found in large granulomata but was usual in draining lymph nodes (16 of 18 cases).

In the remaining group I patients laparotomy was not done. In 19 of these there were compatible clinical, haematological, and radiological abnormalities and complete recovery after antituberculous chemotherapy. In two further subjects colonoscopic examination revealed caecal ulceration, erythema, and oedema. Caseating granulomata but not tubercle bacilli were seen on biopsy and response to specific therapy was excellent.

Thirty nine patients (93%) had predominantly ileocaecal involvement. Two other subjects had isolated colonic disease and a single patient pre-

Table 1 Clinical features

	Group			
	I	II	III	IV
Number	42	27	8	5
Age	34	36	37	42
(Mean + range)	(7–71)	(13–69)	(3–61)	(22–68)
M:F ratio	20:22	16:11	4:4	3:2
Abdominal pain	42	19	3	1
(%)	(100)	(70)		
Nausea/vomiting	19	14	2	1
(%)	(45)	(52)		
Acute presentation	19	15	1	1
(%)	(45)	(55)		
Weight loss	23	13	6	1
(%)	(52)	(48)		
Abdominal mass	18	6	0	0
(%)	(43)	(22)		
Ascites	2	16	0	0
(%)	(4)	(59)		
Fever	26	19	8	5
(%)	(60)	(70)		

sented with a tuberculous perianal ulcer.

(a) The ileocaecal group.

All but five patients had disease confined to the terminal ileum and caecum. The others had additional ileal or jejunal involvement. Approximately half of this group presented acutely to a medical or surgical unit. In 10 cases there was clinical and radiological evidence of acute small bowel obstruction due to an ileal stricture. Two of these presented with generalised peritonitis caused by caecal perforations. In the remaining acutely presenting patients, differentiation from an appendix abscess or from acute Crohn's disease was difficult.

All patients with ileocaecal tuberculosis complained of abdominal pain. This was extremely variable in duration, severity, and site. Patients presenting acutely had pain typical of intestinal obstruction, local or generalised peritonitis. The chronic group was usually a more taxing diagnostic problem. Some patients presented a relatively short history of right iliac fossa pain associated with tenderness and a mass. Others described more insidious generalised abdominal pain extending over months and had a paucity of physical signs. Two such patients had previously been diagnosed as suffering from an irritable bowel syndrome. A further subject underwent partial gastrectomy for peptic ulcer disease and was found to have jejunal and ileal tuberculous strictures. Vomiting and weight loss were relatively common non-specific symptoms.

The most useful physical signs were a right iliac fossa mass which was frequently tender, and fever.

Fig. 1 Resection specimen from patient with ileocaecal tuberculosis. Gross thickening of terminal ileum with luminal stenosis.

These were each present in approximately half of the patients. Cough was present in the minority of subjects and clinical examination of the chest was normal in all. Radiological investigations of the small bowel were always abnormal in this group. Plain abdominal radiographs showed evidence of obstruction or paralytic ileus in acutely presenting subjects. Barium follow through examination of the small bowel showed ulcerating, irregular strictures often with a considerable mass effect. An example is shown in Fig. 3.

(b) Colonic tuberculosis

Two Ugandan Asians presented independently with strictures in the transverse colon but ileocaecal sparing. An example is shown in Figure 4. Both patients had colicky lower abdominal pain, altered bowel habit and fever. Differentiation from Crohn's

disease was difficult. Colonoscopy was then unavailable and the diagnosis was established by laparotomy.

(c) Perianal ulcer

A 68 year old alcoholic Irishman presented with weight loss and fever and was found to have a painless perianal ulcer. The diagnosis was established by biopsy of the ulcer and confirmed by the finding of tubercle bacilli in the sputum.

GROUP II

Tuberculous peritonitis was the second commonest mode of presentation, occurring in 27 patients (30%) (Table 1). The mean age and sex ratio were similar to those of group I subjects. Three subgroups were identified:

Fig. 2 Histological section of terminal ileum showing transmural inflammation, non-caseating granulomata and giant cells. Haemotoxylin and eosin stain $\times 40$ (original magnification).

(a) Wet

Sixteen patients presented with ascites, and eight of these also complained of weight loss and fever. The ascitic protein concentration was always greater

than 20 g/litre. Tubercle bacilli were identified in only four subjects although paracentesis was carried out in all.

The diagnosis was made by laparotomy in 11

Fig. 3 Barium follow through radiograph showing typical ileocaecal tuberculosis with irregular stricturing of the ileum and caecum and a mass effect.

patients. In four cases this was carried out by a gynaecological unit for a presumptive diagnosis of ovarian carcinoma. Tuberculosis granulomata were noted throughout the peritoneal cavity. In one further patient who presented with ascites and a pleural effusion, caseating granulomata were identified in a pleural biopsy.

(b) Dry

Seven patients presented with subacute intestinal obstruction due to tuberculous small bowel adhesions. In one of these caseating granulomata were noted on colonoscopically obtained caecal biopsies. All patients underwent emergency or elective laparotomy and in each case tuberculosis was diagnosed

Fig. 4 Barium follow through radiograph showing strictures in the transverse colon and sparing of the ileocaecal region.

histologically.

(c) Fibrous

Four patients presented with abdominal pain, distension, and an ill defined, irregular tender abdominal mass. Laparotomy showed omental thicken-

ing and adhesions to the peritoneal contents. The diagnosis was confirmed histologically.

GROUP III

Eight patients (9%) presented with low grade fluctuating pyrexia, usually associated with weight

loss but without localising symptoms or signs. All had moderate rises in their serum alkaline phosphatase concentration. Liver biopsy showed non-caseating granulomata which were usually ill-defined (Fig. 5) and in only one case associated with the identification of tubercle bacilli. The clinical diagnosis of tuberculosis was confirmed by complete recovery after a period of antituberculous therapy.

One patient presented as an emergency with severe lassitude and fever. The remaining subjects complained of several months of ill health and night sweats. Rigors were absent and there were no abnormal findings on chest or abdominal examination.

GROUP IV

This comprises five (6%) patients presenting acutely (one subject) or chronically with abdominal pain, weight loss, and fever. The diagnosis was suggested by an abnormal chest radiograph and confirmed by finding tubercle bacilli in the sputum. Abdominal symptoms resolved after specific chemotherapy.

GROUP V

The miscellaneous group comprised eight patients (9%).

A 27 year old Indian man and a 24 year old Indian woman presented independently with miliary tuberculosis. Both were extremely ill and had evidence of neurological, pulmonary and renal disease in addition to intestinal and peritoneal involvement. One patient died after a caecal perforation, the other died from tuberculous meningitis. The diagnosis was

confirmed by necropsy in both cases.

One 33 year old Indian man and two Indian women aged 32 and 49 years presented with abdominal pain, weight loss, hepatosplenomegaly and generalised lymphadenopathy. The diagnosis of tuberculosis was established by lymph node biopsy and each subject made a full recovery following antituberculous therapy.

A 30 year old Kenyan Asian man presented with fever and a cold abscess in the anterior abdominal wall. Biopsy showed caseating granulomata and the mass resolved after chemotherapy.

INVESTIGATIONS

The mean haemoglobin concentration, white cell, platelet count and ESR of the five groups were very similar (Table 2). The ESR was greater than 40 in 66 patients (73%) and greater than 80 in 24 patients (27%). The chest radiograph showed evidence of active tuberculosis in the minority of subjects. Thirteen (31%) group I patients had an abnormal chest radiograph consistent with pulmonary tuberculosis but none had tubercle bacilli on sputum culture. Thirteen (48%) patients from group II had an abnormal chest radiograph and although three of these had a productive cough, none had a positive sputum culture. Pulmonary investigation for tuberculosis was negative in all group III subjects. By definition all group IV and the two patients with miliary tuberculosis had obvious pulmonary tuberculosis. Tuberculin skin testing was not usually diagnostically helpful. Mantoux or Heaf tests were done in a total of 65 patients. A negative test was

Fig. 5 Needle liver biopsy from a group III patient showing a non-caseating hepatic granuloma. Haematoxylin and eosin stain $\times 40$ (original magnification).

Table 2 Diagnostic aids

	Group			
	I	II	III	IV
Hb g/dl	11.1	11.1	11.6	11.8
(mean±SD)	0.1	0.1	0.5	1.0
WBC×10 ⁶ /l	6.2	7.5	9.5	7.1
(mean±SD)	(3)	(4)	(2)	(5)
ESR mm/hour	58	56	75	74
(mean±SD)	(20)	(13)	(40)	(35)
Tuberculin test (no and %)				
Strongly +	8 (28)	9 (52)	2	4
+	18 (62)	5 (29)	4	1
–	3 (10)	3 (18)	0	0
Abnormal chest radiograph (%)	13 (31)	13 (48)	0	5

present in seven patients (11%), a weakly or moderately response occurred in 34 subjects (52%) and a strongly positive test developed in the remainder (37%). There were no differences in the response rates of group I and group III patients although four group IV subjects had a strongly positive tuberculin test.

TREATMENT

1 Acute presentation (36 patients)

Patients presenting with intestinal obstruction or perforation underwent intestinal resection. Other subjects presenting an acute abdominal emergency underwent diagnostic laparotomy without resection. Laparotomy was followed by specific chemotherapy in each case. Sixteen patients presented acutely with abdominal pain but did not undergo laparotomy. All responded to chemotherapy.

2 Chronic presentation

Two patients with ileocaecal tuberculosis underwent diagnostic elective laparotomy and right hemicolectomy. Laparotomy was purely diagnostic in the remaining 19 patients who underwent surgery.

CHEMOTHERAPY

Following diagnosis each patient received specific antituberculous chemotherapy with three or four drugs. The majority (75 patients) received isoniazid and rifampicin for nine to 12 months. This was supplemented with three months of ethambutol in 45 patients, pyrazinamide in seven patients, pyrazinamide and ethambutol in six patients and streptomycin in five subjects. The remaining patients were treated in the 1970's with a combination of isoniazid and PAS for 18 months supplemented with streptomycin for the first three months. Three

gravely ill patients were also given high dose intravenous corticosteroids; they all died. Treatment was apparently well tolerated. There were only three significant complications. One patient developed ataxia whilst taking streptomycin, one developed a rash 10 days after starting pyrazinamide and one patient developed isoniazid associated hepatitis.

OUTCOME

Five patients died as a result of abdominal tuberculosis. Two patients with miliary tuberculosis died within days of diagnosis. One died in coma attributed to tuberculous meningitis, the other died from generalised peritonitis due to a tuberculous caecal perforation. A 56 year old Indian man died shortly after a laparotomy which revealed 'dry' tuberculous peritonitis. At necropsy much of the peritoneum had apparently been shed. A 61 year old alcoholic Irishman died one week after a laparotomy carried out to relieve intestinal obstruction because of ileocaecal tuberculosis. He had severe bronchiectasis and developed postoperative pneumonia. A 62 year old Ugandan Asian man died from a pulmonary embolus seven days after a diagnostic laparotomy for 'wet' tuberculous peritonitis. The remaining 85 patients responded well to antituberculous drugs. Fever usually resolved within 14 days and was associated with a corresponding fall in the ESR. No patient developed clinical evidence of intestinal stricture after completing chemotherapy. No subject relapsed following antituberculous therapy.

Discussion

In an urban population containing a large number of Asian immigrants abdominal tuberculosis is not rare. In this study the incidence of abdominal tuberculosis was approximately five cases per 100 000 population per annum. Over the 10 year period 1973–1983, nine new patients presented to the Central Middlesex Hospital each year. This was very similar to the incidence of newly diagnosed Crohn's disease,⁸ which is the major diagnostic alternative. In our experience Crohn's disease occurs rarely in Asian immigrants and others have shown that this disease is rare in the Indian subcontinent.⁴ In contrast, abdominal tuberculosis is rare in the indigenous British population, the exception being the malnourished and alcoholic. Our experience is similar to that reported from Yorkshire⁶ in which 45 of 52 patients who developed abdominal tuberculosis originated from India. It contrasts with the conclusions of a small study from Cardiff¹ in which five of eight patients were Welsh or Scottish. This probably reflects the high incidence

of pulmonary tuberculosis in the mining area of South Wales.

Abdominal symptoms developing in a young Asian should always suggest tuberculosis. The clinical spectrum of abdominal tuberculosis is wide and in our series patients presented to physicians, surgeons or gynaecologists with a wide variety of symptoms. The commonest of these was pain. This was either due to mechanical obstruction, perforation or an inflammatory mass. Almost half of our patients presented acutely to a medical or surgical unit. This is unlike the patients described in a series from Scotland⁵ in which only two of 48 patients presented acutely. It is similar to the experience of Khoury *et al*⁷ from London and to that of Das and Shukla⁹ in India. Perforation, once thought rare in caecal tuberculosis,¹⁰ has been reported with increasing frequency in recent years.^{11 12} Abdominal pain may alternatively be insidious in onset and poorly localised. In our patients presenting chronically pain had been attributed to a variety of causes before the definitive diagnosis was established. These included the irritable bowel syndrome, peptic ulcer and chronic pancreatitis. Helpful features were weight loss and fever, but each of these only occurred in about half of our patients.

The most helpful physical sign in patients with ileocaecal tuberculosis was that of a right iliac fossa mass. This was present in 45% of cases. Appendicitis is unusual in Asian immigrants and such a mass in these individuals is much more suggestive of tuberculosis than either Crohn's disease or an appendix abscess. The diagnosis of 'wet' tuberculous peritonitis was relatively simple as all patients had evidence of ascites. 'Dry' or 'fibrous' peritonitis was much more difficult; the only physical signs were those of intestinal obstruction or an unusual (omental) abdominal mass. Like others,⁹ we very rarely encountered the classical 'doughy' abdomen described in abdominal tuberculosis.

In this study the most useful investigations in patients with suspected abdominal tuberculosis were the ESR, barium follow through examination and liver biopsy. Like previous workers we found that the ESR is usually raised in tuberculosis.^{1 12} Nevertheless 26% of subjects had an ESR less than 40. Barium follow through or barium enema examinations were always abnormal in subjects with intestinal tuberculosis. The typical findings of an ulcerated terminal ileal stricture with proximal bowel dilatation were usually impossible to differentiate from those due to Crohn's disease and some radiographs showed 'skip lesions', in ileum, jejunum or colon. Other diagnostic possibilities suggested by these studies included lymphoma and caecal carcinoma. Contrast radiology was normal in patients with

tuberculous peritonitis. Percutaneous needle liver biopsy was a useful diagnostic aid. The presence of poorly formed, relatively small granulomata suggests tuberculosis whilst more discrete granulomata are more suggestive of sarcoidosis.^{9 13} Caseation of hepatic granulomata in our subjects was rare and tubercle bacilli were rarely encountered. The finding of liver granulomata does not necessarily imply acute tuberculous infection. There are many causes of hepatic granulomata¹³ and even when tuberculosis is responsible for their development, granulomata could be merely a consequence of previous disease. Nevertheless, in an Asian subject with fever and abdominal symptoms their presence is strong evidence for the diagnosis of abdominal tuberculosis.

Contributory investigations were the chest radiograph, sputum culture, colonoscopy, paracentesis, and tuberculin test. Most patients denied respiratory symptoms and sputum culture was only positive in three of 72 patients. The chest radiograph was abnormal in the minority of subjects. This contrasts with early studies in which pulmonary tuberculosis was present in up to 70% of patients presenting abdominal symptoms.¹⁴ More recent reports have described a much lower incidence of pulmonary disease.^{6 12 15} Colonoscopy was carried out in seven patients after the demonstration of an abnormal caecum on barium enema or follow through examination. The gross appearance of the affected caecum was indistinguishable from that of Crohn's disease but the diagnosis of tuberculosis was established by histological demonstration of caseating granulomata in four patients. Like Franklin *et al*,¹⁵ and Breiter and Hajjarr¹⁶ we now advocate more aggressive use of colonoscopy in the investigation of suspected abdominal tuberculosis because laparotomy may then be unnecessary. While it is our policy to examine ascitic fluid for protein concentration and tubercle bacilli in all patients presenting with ascites, we and others^{9 17} have found little diagnostic yield in abdominal tuberculosis. The protein concentration is invariably high but this does not differentiate from pyogenic infection, intra-abdominal malignancy or hepatic vein thrombosis. Tubercle bacilli were found in only four of 16 patients with 'wet, tuberculous peritonitis. Laparoscopy⁹ and 'punch' peritoneal biopsy^{9 17} have been used with some success in this condition, but we have no experience of their use.

Tuberculin testing, either by the Mantoux or Heaf test had limited diagnostic value. Patients with radiological evidence of active pulmonary tuberculosis usually had a strongly positive skin test but the majority of subjects with intestinal or peritoneal disease had a mildly positive test compatible with

past disease or BCG. In this series the diagnosis of abdominal tuberculosis was frequently made at laparotomy. Workers in India¹⁸ suggested that laparotomy itself had an adverse effect upon the prognosis of the disease and in a large series of patients the perioperative mortality was 20%. This high figure was undoubtedly partly related to pre-operative malnutrition and more recent studies^{9 12} have not confirmed this high surgical mortality. Indeed in some acutely presenting patients, laparotomy is life saving and we do not believe that the possibility of abdominal tuberculosis should represent a contra-indication to operative management. Although in this series diagnostic laparotomy was relatively safe and well tolerated procedure, we now only rarely recommend elective surgery to differentiate abdominal tuberculosis from Crohn's disease or malignancy. Our early experience with tuberculosis has taught us that abdominal symptoms and signs in an Asian subject justify a therapeutic trial with antituberculous agents. Our current policy is to recommend triple therapy and closely monitor the clinical and haematological response. Response to chemotherapy was excellent and we have no evidence to suggest that any one combination of drugs was superior to another. In general it is now felt that optimum antituberculous therapy comprises nine months of isoniazid and rifampicin supplemented for the first three months with pyrazinamide.¹⁹ Pyrazinamide is preferred to ethambutol because of a lower frequency of side effects and we now use this regime. The choice is therefore a matter of convenience and should be governed by patient acceptability and the risk of side effects. Routine post-treatment contrast radiology was not repeated in subjects with intestinal tuberculosis. There is evidence that such patients may develop intestinal strictures despite eradication of the active disease.²⁰ None of the 47 patients who comprised group I developed abdominal symptoms after completion of therapy and we feel it is unlikely that significant stricture formation was common in these subjects.

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